EXHIBIT 123

Google Ad Exchange

Project Romulus

Status: Draft (as of 8-5-08)
updated 12/1/08 - Links to detailed design docs
update 2-18-09 various updates including creative model writeup
Update 7/09 Update with billing and rev share details

Eyal Manor<emanor@google.com>
With help from many googlers

Objective

The Google Ad Exchange is an open, transparent market place where buyers and seller can transact regardless of their preferred interface and network affiliation. The goal is to create an unbiased, independent solution for network buyers and sellers to transact with any desired network, advertiser or publisher/site. Today's display inventory is fragmented, even for repeated buys and standard inventory there is little industry wide visibility into available products. *The Google Ad Exchange offers a central clearing house where buyers and seller benefits from aggregated inventory and Google become a strategic marketplace for every impression that is auctioned.*

This document will define the Exchange building blocks, high level design, auction process and outline the changes required in existing components.
This document will not include detailed design information on every components of the Exchange, rather only links to the appropriate design doc.

Disclaimer - Document is still under construction at this time

Background

Large publishers try to sell Web site advertising space through their sales forces at high prices. Most cannot sell all their inventory, according to Forrester online publisher manage to sell directly only 75%, out of that 60% is preemptible. The distinction term often used are 'guaranteed inventory' vs. 'non-guaranteed'. The Google Ad Exchange will allow any publishers to transact openly with any buyer or network through open means so they monetize the leftover, or "remnant" ad space as well as any non-guaranteed impression via dynamic yield optimization.
The Exchange is geared towards display creatives (image, rich media, flash) , in fact text creatives are not picked up by the build pipeline jobs for 3rd party network buyers. AdWords text ads can bid on Ad Exchange ad space in an ad-block format compliant with IAB standards.

DoubleClick started building out the Ad Exchange (or AdX for short) in 2006 in order to solve the problem of better monetizing remnant inventory for publishers. In its simplest form, it is a pure second-price CPM auction that matches advertisers to impressions given a set of restrictions and constraints. This was launched in summer of 2007, and as of April 2008, there are roughly 800M impressions going through the Ad Exchange daily.

The Ad Exchange is geared towards delivering image and rich media creatives with the intention of targeting Display Brand and Direct-Repsonse advertisement budgets.

Reference ADX PRD v2, Google Ad Exchange - The Big Picture

The Exchange aims at providing an open marketplace for buyers and sellers of IAB standard Ad space . Technically, there will be multiple public interfaces exposed to Exchange members:

1. Ads API : Advertisers - Granting full access for buyers for creating campaigns, AdGroups and uploading creatives. A comprehensive set of interfaces is exposed today in NETAPI. The intention is to extend current capabilities with Exchange specific controls. Unimplemented control will default to system values. Networks and agencies require this interface to provision bulk operations on behalf of their advertisers using own proprietary choice of UIs.
2. Publishers API- Granting similar access to sellers via the AdSense/xFP API. Interfaces will support bulk operations allowing 3rd party systems to create AdX AdSlots, Channels and set attributes/restrictions. Implementation should default to AdSense network values if not set.
3.
4. AdServing call-ins - Direct HTTP request to the Exchange mixer (via GFE, and CAFE) from a publisher's adserver requesting to seek for an above dynamic min CPM ad. The basic set of the API will include an eCPM value set by the partner primary AdServer, and a fall back URL to be rendered when the Exchange does not meet this criteria. (For more see the following design doc)
5. Real time bid management (aka network bids) - ADX mixer sends a request for a real time bid prior to running the final Adx auction. Special Ad Groups would be enabled for real time bids in the Ads DB adhering to all pre-targeting setting of the campaign. The goal of this interface is to allow Ad Network to modify bid based on every impression. RTB will provide in the bid request a comprehensive set of descriptors encompassing as much information as possible on the impression, site and user in order for the bidder to target own ads and chose the best creative to server. The request is sent to a 3PAS ad server that returns the bid value and a dynamic creative URL based on the impression properties and cookie information. We are also looking into providing a bidding server prototype based on Google's own apps engine as a reference. (for more see http://go/copdesign)

The Exchange will provision new UI allowing buyers and sellers to transact through their preferred front end platforms. AdWords Front End will be branded to include these controls for the benefit of the exchange buyers - www.google.com/adxbuyer .
AdSense FE will also be modified to include the GAX seller controls and expose them through the Ads API for external users: www.google.com/adxseller

AdSense ICS will include new controls for the following requirements:
● Create a new web property
● Set Adx account details: custom, rev share, sub-syndication, ad units and restrictions
● Red buttons: disabling or suspending specific network from showing ads and allowing to set a min CPM transaction rate.

GAX will replace the DoubleClick Ad Exchange (built on Doubleclick Technology stack) which will be gracefully retired. We plan to migrate all 234 Buyer and Seller accounts from DoubleClick Adx 1.0 to Google Adx Exchange via automated PEBL scripts from into Ads DB.

Product Integration

Integration points of AdX with other Google products:

- AdSense3 Front End
- AdWord3 and Web API (SOAP), AdWords Editor
- Kansas
- Ads DB- buy and sell sides
- AdSense ICS
- User lists in Content Ads
- CAT2 Infrastructure, Auction
- ADX Reservation Market Place (need to add more details)
- XFP- tight integration
- GAM- tight integration
- Sitetool and AIS backend
- DART Enterprise
- DFP
- AFF - AdSense for feeds
- AdSense mobile (IAB standards only)
- DFA - DART for Advertisers
- Moneta

Product Considerations

Web Property naming conventions:

- AdSense uses CA-PUB-1234, considering for ADx CA-**ADX**-1234 to allow easy distinction on various finance systems and ads dash
- Integration roadmap with xFP

Privacy Considerations

> # Redacted - Privilege

Spam and Abuse Considerations

How to authenticate 3PAS? Establishing a SSL connection for each ads request is probably too expensive. Without SSL, a hacker could easily sniff the packet from 3PAS to Adx, and even worse, impersonate a 3PAS, request lots of impressions without ever displaying any. Talk to AdSense team to find out how they handle it.

For the call out, we need to authenticate ourself as Google Adx. Otherwise a malicious third party will be able to query the 3PAS and find out how much they are willing to pay for various type of ad slots. Again one SSL per query seems too expensive, but without SSL someone might impersonate Google Adx.

1. Spammers often create accounts in bulk to spam a service. How would you detect

that? If your users sign up using gaia, GRADS spam score may help to find such bulk account creation.

2. Spammers often do large number of activities in a short time period, something that normal users do not engage in. You may want to consider rate limiting users' activity (e.g., #api calls per minute, emails sent per day, etc.). The Quota Server is available for this purpose.

3. You may consider classifying spam and abusive content by algorithmic means. The general purpose spam classifier (SpamIAm) or the repository of objectionable content (Ocelot) are available to aid in this effort.

4. Do you provide users a way to report abuse and have a tool for your product ops team to review such reports? You may consider integrating with the Common Abuse Review Tool (CART) for this purpose.

Latency

The Ad Exchange connects between publisher's primary ad server and 3rd party networks. As such, it has the potential to impact consumer experience by increasing latency of ad delivery or to provide controls to ensure consumer experience is protected.

A typical call to the ad exchange originates in the publisher's primary ad server and then calls a 3rd party network. The process follows the following pattern:

	Transaction Segment	Latency Goal (ms, per step [cumulative])	Notes
1	Initial web-server + tag calling the publisher's primary ad server (on page)	220	Only partially under Google's control when using GAM of DFP.
2a	Direct http call-out to the ad exchange (booked in publisher's primary ad server)	50 [270]	This is the planned implementation with XFP / AdX. update: 50->120 ms
2b	External redirect to the ad exchange (booked in the publisher's primary ad server)	100 [320]	
3	Ad Exchange AdServing	50 [370]	CAFE, Doc processing (90% *)
4	Ad Exchange calls other networks through call-out proxy to solicit bids	50 [420]	This is network latency and can be mitigated through co-location or through use of the app engine
5	Network makes decision, returns call-out proxy request	100 [520]	This is a cap. Networks that don't respond in time would not be eligible for the impression
6	Ad Exchange decision logic	10 [530]	Auction